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Ontario Highways, Sept. 21

REPORT

OF THE

Accomplishments of the

Highway Department of the Province of Ontario

during the Regime of the

Drury Government

covering the Years 1920, 1921 and 1922



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Minister of Public Works and Highways



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Accomplishments of
THE HIGHWAY DEPARTMENT
of the Province of Ontario
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Every citizen of Ontario is directly or indirectly affected by road conditions. Not merely is the user of them benefited by good roads, but every consumer of farm produce, every manufacturer of raw materials, every merchant, professional man, tradesman, or laborer who is affected by the progress and welfare of the country, even though he may not himself use a motor car or drive a horse, reaps an advantage from good roads in the rural districts. Cities and rural districts are mutually dependent the one on the other; and the city has no better assurance of prosperity for itself than a prosperous rural community surrounding it. Rural prosperity is based upon fertile soil and convenient means of transportation. Ontario has been blessed with the former and is rapidly achieving the latter.

Following a three year period of exceptional activity in this regard, it is fitting that a brief summary of facts should be issued.

CLEAR DIVISION OF RESPONSIBILITY

Three bodies are to-day, in Ontario, responsible for rural road construction and upkeep, namely, the Provincial Highway Department, County Councils and Township Councils. Each body has a definite mileage of roads under its care; and the Province, in addition, aids and subsidizes the work of the other two. Their responsibility is well defined.

The Provincial Department is responsible solely for a class of roads carrying the heaviest volume of traffic—Provincial Highways; county councils are responsible for a class of roads, "County Roads," the main roads of local market travel, which carry a volume of traffic intermediate between Provincial Highways and township roads; township councils are responsible for the remaining roads, those which, as a rule, are lightly travelled, and do not demand the heavier types of construction required on county roads and Provincial Highways.

Thus county and township roads are under the control of county and township councils, respectively. These are elected bodies, directly responsible to the ratepayers. The Provincial Department of Highways has therefore consistently held to the principle that county and township councils, and not the Provincial Department, are directly responsible to the people for the condition

of county and township roads, and the amount of county and township expenditure on them.

The Provincial Department relieves county and township taxation by annual subsidies to county and township roads, paying one-fifth of the entire township cash expenditure, and about one-half of the county expenditure. The Highway Department seeks to protect the Provincial subsidy by engineering inspection, chiefly of an advisory nature; but cannot relieve county and township councils from responsibility for their work and expenditure on county and township roads. This includes what are known as "County Provincial" and "County Suburban Roads," which are merely a sub-classification of county roads.

The amount and nature of work to be done, the amount of expenditure, are for the respective councils to determine, and for which councils are directly responsible to the electorate.

VARIATION IN ROADS

Why are all roads not built alike and according to the same standard?

There are many reasons, chief of which, are the amount and kind of traffic carried; the local material available for surface and foundation, and the type of construction to which this material is adapted; the scarcity or absence of all local material in many cases; the class of soil on which the road is built; the amount of hill-cutting required; the filling of swamps; the ravines to be crossed, and bridges to be built. Such varying conditions, and many others, are responsible for the rule that no two roads should be built in the same way or at the same cost.

ROADS AND TRAFFIC

What influence has traffic on roads?

Roads are built to serve and create traffic. The benefit of a work of road construction depends on two factors: namely, the amount of traffic now using the road; and the amount of new traffic which the improved road will develop and create. Traffic is the prime reason for the existence of roads.

A traffic census taken during the first week of September, 1922, shows the average daily traffic at a few points on the Provincial Highways to be as follows:

West of Kingston	1,005
East of Brantford (Hamilton Road)	1,607
East of Hamilton (Queenston Road)	2,341
East of Ottawa (Montreal Road)	1,143
North of Toronto (Yonge Street)	1,490
East of Toronto (Kingston Road)	1,787
West of Toronto on Toronto and Hamilton Highway	8,237

Observation on township roads has shown that many do not carry more than five or ten vehicles daily. Many county roads do not carry more than forty or fifty vehicles daily. Construction costing \$1,500 a mile might make an excellent road for ten vehicles daily; and an expenditure of \$7,000 or \$8,000 a mile is sufficient for numerous county roads. Yet these expenditures for Provincial Highways carrying 3,000 vehicles daily would be merely money thrown away.

The farmer living on or using a Provincial Highway is as much entitled to a good road as is a property owner who does not need to use a heavily travelled road. Yet experience has shown that there can be no worse road than one which, heavily travelled, has not been adequately built to serve the heavy traffic. If a road is not built to carry all the traffic, it breaks down and becomes as bad as the most neglected township road, and an obstruction to every form of traffic. A farmer should not be penalized because he lives on or near a main road.

But rather, the principle of "the greatest good to the greatest number" demands that the main roads should be built; for like the trunk of the tree, these main roads are the trunk lines which support many lateral branches.

Where ten vehicles a day use a road, an expenditure of \$3,000 per mile requires a capital investment of \$300 per vehicle. Where a road is used by 3,000 vehicles daily, a cost of \$45,000 per mile is only a capital expenditure of \$15 per vehicle. Measured in terms of service and traffic, the apparently most expensive roads are in reality the most economical.

Road construction and maintenance have been revolutionized by modern traffic conditions. The carrying capacity, and consequently the economic value of roads have been enormously increased by the passenger motor car and motor truck. A much greater expenditure is to-day necessary and justifiable, as compared with the days when roads carried horse-drawn traffic alone. The transportation value of the road is now proportioned to the distance and load capacity of the motor car and motor truck.

ROAD CLASSIFICATION

The several classes of roads in Southern Ontario, in the area covered by county organization, are as follows:

	Miles
Total Township Roads	38,240
Ordinary County Roads	7,356
County Provincial Roads	1,905
County Suburban Roads	401
County Provincial Suburban Roads	150
Total County Roads	9,812
Provincial Highways	1,465
Provincial Suburban Highways	358
Total Provincial Highways	1,823
Total Roads in Southern Ontario	49,875

The foregoing schedule shows that cities are contributing to the cost of constructing and maintaining 909 miles of road. These are the most heavily travelled roads in the Province, and the expenditure is therefore proportioned to traffic, rather than to mileage.

The schedule shows that county roads and Provincial Highways aggregate 11,635 miles, while township roads amount to 38,240 miles. Nevertheless, township roads carry less than one-quarter of the total volume of traffic served by county roads and Provincial Highways.

The Province contributes 20 per cent. of the cash expenditure on township roads, and nearly half of the expenditure on county roads. Having regard to the total volume of traffic, which is at least four times as great on county roads as on township roads, it is evident that the proportion of Provincial grant to township and county roads is substantial.

PROGRESS TO DATE

The road situation in rural Ontario within the arc of county organization, at the end of 1922 is represented by the following mileages of surfacing:

Gravel Roads	23,653.0 miles
Broken Stone (macadam)	3,572.2 miles
Oiled and Tarred Macadam	227.4 miles
Bituminous Macadam (penetration)	188.9 miles
Asphaltic Concrete	79.9 miles
Cement Concrete	190.0 miles
Vitrified Brick	0.5 miles
Earth Road, graded	21,964.0 miles

Total mileage	49,875.7 miles
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Percentage of roads surfaced	55.9 %
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This high percentage of surfaced roads in Ontario is due largely to the use of gravel in districts where gravel is plentiful. In some townships, nearly all the roads have been gravelled. This condition is not readily apparent to residents of districts where no gravel is obtainable; and particularly in localities where even stone is not available.

EARTHWORK, GRADING AND DITCHING

A first step in the building of roads is to properly grade them. This includes the ditching of the road, raising the travelled portion so as to shed water, cutting down hills, widening the existing grades, filling ravines and marshes.

Many roads are deficient in grading. Drains are insufficient, are not carried to proper outlets, and hills and ravines are left in a steep and narrow condition, and much valuable expenditure for gravel and stone surfacing is wasted. The heavy traffic on Provincial Highways is such that effective grading and earthwork is a primary essential to economy of upkeep.

Grading costs vary according to the class and amount of material moved. The cheapest work is in sand or sandy loam, where the land is just sufficiently undulating to give frequent and easy outlets for drainage. Clay with hill-cutting becomes considerably more expensive; while the maximum of expense is in cases where heavy rock grading is involved, or long stretches of swamp are to be filled.

Heavy traffic justifies a considerable expenditure for grading, based on the aggregate saving in cost of haulage and travel. Comparing two roads where the number of vehicles is in the proportion of one hundred to one, the aggregate traffic saving is in proportion of one hundred to one; and the economic value of the road is one hundred times greater in one case than in the other.

Many ravines are bridged; and a bridge is looked upon as an ordinary necessity. Yet an earth fill through a ravine or across a marsh is merely a bridge of maximum permanence. On the Provincial Highway System, notably in the vicinity of Kingston, Brockville, Owen Sound, Hamilton, the grading has involved considerable rock excavation. The improvement of these sections is not merely of local value; but is necessary in the interest of the highway system as a whole. The work would gladly have been omitted by the Highway Department; but natural conditions existed which made the work necessary.

CULVERTS

The type of culvert formerly built on rural roads was a narrow structure, with extensive wing walls, and fourteen or sixteen feet between more or less elaborate guard rails.

Many of these culverts and bridges were carelessly built as to foundation, with the result that they were falling to pieces; and it was advisable to remove them rather than to try to repair or extend them in meeting the permanent needs of the Provincial Highways. To have retained them would have meant the tearing up and obstruction of the highway in a few years, to rebuild the entire structure at much increased cost.

The type of structure used on the Provincial Highways is on the average no more expensive than the old narrow type. The expenditure formerly put into wing walls and guard rails is now put into additional length to carry the full width of grade. The result is additional convenience, increased safety, and less cost for maintenance.

SURFACING AND PAVING

Road surfaces in Ontario are commonly of gravel, broken stone (macadam), broken stone penetrated to a depth of 3 or 4 inches with asphalt or tar, cement concrete, asphaltic concrete on either a macadam or concrete foundation.

Gravel roads may be protected from wear by an application of light oil or calcium chloride; while broken stone (macadam) may be protected and made dustless by an annual application of asphaltic oil or tar.

The type of surface used on any given road should depend largely on the local materials available, and the amount of traffic. In some parts of Ontario, gravel is abundant; other parts have little or none; some districts have rock quarries or field stone; while some districts have neither gravel or stone, and all surface material has to be brought in by rail. The surface of each road, then, should be selected according to traffic and material available.

The traffic on the great majority of township roads is well served by a single track of gravel or broken stone. County roads usually need a wider surface of gravel or macadam. Provincial Highways have a standard two track width of twenty feet, for gravel, macadam, and a limited mileage of concrete and asphaltic paving.

Classing cement—concrete and asphaltic—concrete as "pavements," these are laid only within the traffic influence of cities, or between cities where there is much commercial traffic.

On ordinary Provincial Highways, the surfacing of fully graded gravel roads has cost from \$1,500 to \$5,000 per mile; the cost varying principally with the length of haul for gravel, and the condition of the road prior to gravelling.

Macadamized surface with metal 20 to 22 feet in width has cost \$18,000 per mile in such counties as Frontenac, where local material was used; and have amounted to \$22,270 in Haldimand where stone was imported by rail.

Bituminous macadam (tar penetration) cost \$25,500 per mile adjacent to Brockville using local stone; and \$37,000 per mile in Lincoln County, using stone imported by rail.

SUBURBAN ROADS

Prior to existing highway legislation, cities were exempt from the cost of all roads in the open country. With the building of modern roads for modern traffic, it was felt that, in addition to motor vehicle fees, cities should contribute to the main roads, as comprised in county roads and Provincial Highways. Mileages of "Suburban" roads are therefore laid out from existing county and Provincial systems, to which cities are in each case required to contribute equally with the county. That is, in the case of a county suburban road, the county pays 30 per cent., the city 30 per cent., and the Province 40 per cent. For County-Provincial Suburban, the county pays 20 per cent., the city 20 per cent., and the Province 60 per cent. For Provincial Highways, the county pays 20 per cent., the city 20 per cent.

With minor exception, the most expensive paved roads in the Province are of the "suburban" class, county or Provincial. This is equitable and in accordance with the principle that heavy traffic accumulates near cities and demands heavy and consequently expensive construction.

When to this is added the fact that a Dominion subsidy of 40 per cent. has to date been paid on the majority of paved roads adjacent to cities, it is evident that the actual burden on the Province, city or county has been proportionately small.

The programme of Provincial Highway construction now being carried out is made up principally of gravel and broken stone roads. Pavements are chiefly "suburban" to which the cities will contribute 20 per cent. of the expenditures.

The proposed expenditure distributed over a period of five years is as follows:

Pavements, 420 miles at \$45,000 per mile	\$18,900,000
Broken Stone, 512 miles at 30,000 per mile	15,360,000
Gravel Roads, 880 miles at 13,000 per mile	11,440,000
Bridges and miscellaneous	9,300,000

Total \$55,000,000

This expenditure will be financed in the following manner:

Subsidy from the Dominion Government ...	\$5,800,000
Cities, 20 per cent. on suburban	4,000,000
Counties, 20 per cent.	10,200,000
Provincial from Motor Vehicles (capitalized)	35,000,000

Total \$55,000,000

TOTAL ROAD COSTS

The cash expenditure of 376 township councils in 1917, within the area covered by County Road Systems, was \$1,410,000; in 1918, \$1,540,000; in 1919, \$2,330,000; in 1920, \$2,850,000; in 1921, \$3,865,000; in 1922 (estimated), \$3,503,000.

County Road expenditures in the same period have been: 1917, with 30 counties operating under the Act, \$1,345,486; 1918, with 36 counties operating, \$2,216,096; 1919, with all counties (37) operating, \$5,714,938; in 1920, \$7,956,925; 1921, \$11,078,288; in 1922 (estimated), \$9,284,526.60.

The programme for Provincial Highways, for a five year period, elsewhere more fully outlined, amounts to an average of \$11,000,000 per year, but this will substantially complete the work in hand, and will bring it to a stage where a moderate system of repair will maintain the work.

It will be observed that in 1919, immediately after the close of the war, there was a marked increase of expenditure. Owing to neglect during the war, a condition of emergency had arisen, which could only be remedied by a large amount of work. Where there is a tendency to reduce county expenditure, and expenditure on Provincial Highways will be lessened when the present five year programme is finished, indications are that the expenditure on township roads will be maintained.

DISTRIBUTION OF FINANCIAL RESPONSIBILITY

During the three-year period 1920 to December, 1922, inclusive, county councils have raised \$15,225,010.50 for expenditure on all county roads, to which the Province has added \$13,094,729.91, making a total of \$28,319,750.41 on county roads.

In the same period, township councils have raised \$6,865,-329.88, which has been supplemented by \$1,772,273.43 from the Province.

During the foregoing period, the Province has provided \$14,234,327.91 for Provincial Highways; the cities, \$1,965,926.64; the Dominion Government, \$5,600,000; and the counties have been asked to pay \$5,450,063.32.

Thus, during the three year period ending December, 1922, the Province has contributed to township and county roads, and Provincial Highways, \$29,101,331.25; and the counties have been asked to return as their share on Provincial Highways, the sum of \$5,450,063.32.

It is to be remembered that all these are rural roads; and that Provincial Highways and county roads are of maximum township service. In the stated three year period, on all rural roads there has been expended \$64,207,661.59, of which there has been provided by other than rural sources, the sum of \$36,667,257.89, or over 57 per cent.

In greater detail, expenditures and Provincial subsidies, according to counties, for the three year period ending December, 1922, have been as follows:

Statement of Expenditure on Road

COUNTY	COUNTY ROADS			PROVINCIAL CO	
	Total	By County	By Province	Total	By Co
Brant	\$ 310,044.97	\$ 186,026.98	\$ 124,017.99	\$ 357,817.89	\$ 143,1
Bruce	308,389.69	185,033.82	123,355.87	301,660.45	120,6
Carleton	1,620,288.02	972,172.82	648,115.20	710,160.47	284,0
Dufferin	265,341.44	159,204.86	106,136.58	55,948.94	22,3
Elgin	448,416.77	269,050.06	179,366.71	97,072.97	38,8
Essex	776,707.64	466,024.58	310,683.06	540,584.60	216,2
Frontenac	205,689.45	123,413.67	82,275.78	41,052.28	16,4
Grey	461,421.26	276,852.76	184,568.50	523,191.90	209,2
Haldimand	556,129.15	333,677.49	222,451.66	25,694.90	10,2
Halton	230,477.16	138,286.29	92,190.87	260,839.47	104,3
Hastings	305,330.09	183,198.06	122,132.03	198,396.30	79,3
Huron	428,747.94	257,248.77	171,499.17	123,789.85	49,5
Kent	456,901.70	274,141.01	182,760.69	702,104.28	280,8
Lambton	395,527.60	237,316.56	158,211.04	176,703.54	70,6
Lanark	330,225.64	198,135.39	132,090.25	194,115.66	77,6
Leeds & Grenville	574,882.95	344,929.77	229,953.18	61,126.30	24,4
Lennox & Addington	168,910.96	101,346.58	67,564.38	117,461.06	46,9
Lincoln	1,116,736.58	670,041.95	446,694.63	.....	.....
Middlesex	562,373.58	337,424.15	224,949.43	65,769.29	26,3
Norfolk	599,552.16	359,731.27	239,820.89	296,729.19	118,6
Northumberland & Durham	242,647.49	145,588.49	97,059.00	136,541.08	54,6
Ontario	267,686.21	160,611.73	107,074.48	117,311.14	46,9
Oxford	400,655.24	240,393.15	160,262.09	54,997.14	21,9
Peel	353,805.69	212,283.41	141,522.28	1,340.43	5
Perth	190,176.30	114,105.78	76,070.52	49,308.52	19,7
Peterboro	137,665.21	82,599.13	55,066.08	14,930.75	5,9
Prescott & Russell	1,589,984.89	953,990.93	635,993.96	320,795.99	128,3
Prince Edward	227,032.10	136,219.26	90,812.84	52,534.17	21,0
Renfrew	663,494.19	398,096.52	265,397.67	500,120.44	200,0
Simcoe	478,582.45	287,149.47	191,432.98	272,489.45	108,9
Stormont, Dundas & Glengarry	1,051,276.28	630,765.76	420,510.52	881,578.82	352,6
Victoria	234,579.53	140,747.72	93,831.81	226,334.03	90,5
Waterloo	306,537.99	183,922.79	122,615.20	228,023.30	91,2
Welland	818,088.59	490,853.16	327,235.43	448,038.83	179,2
Wellington	441,495.38	264,897.22	176,598.16	104,459.05	41,7
Wentworth	561,212.95	336,727.77	224,485.18	164,102.77	65,6
York	1,398,556.32	839,133.79	559,422.53	411,043.60	164,4
Totals	\$19,485,571.56	\$11,691,342.92	\$7,794,228.64	\$8,834,168.85	\$3,533,66

Counties \$20,675,073.82=32.24%.
 Townships 6,865,329.88=10.70%.
 Cities 1,965,926.64= 3.06%.
 Province 34,701,331.25=54.00%.
 \$64,207,661.59=100%.

overing the Years 1920, 1921 and 1922

ROADS		TOWNSHIP ROADS		PROVINCIAL HIGHWAYS		
By Province	Total	By Townships	By Province	Total	County's Share	Province & City's Share
\$ 214,690.74	\$ 138,572.82	\$ 109,931.07	\$ 28,641.75	\$ 772,126.43	\$ 154,425.28	\$ 617,701.15
180,996.27	239,340.81	191,195.49	48,145.32	210,415.46	42,083.08	168,332.38
426,096.27	299,158.38	237,454.31	61,704.07	2,027,883.42	405,576.67	1,622,306.75
35,569.36	137,316.72	109,721.99	27,594.73	281,022.75	56,204.55	224,818.20
58,243.78	325,411.65	258,218.74	67,192.91	575,939.34	115,187.87	460,751.47
324,350.76	194,904.49	155,187.04	39,717.45	531,805.61	106,361.10	425,444.51
24,631.38	54,950.60	43,579.35	11,371.25	925,374.57	185,074.91	740,299.66
313,915.14	357,800.68	285,541.77	72,258.91	266,772.30	53,354.46	213,417.84
15,416.94	74,223.43	59,048.03	15,175.40	1,008,856.42	201,771.28	807,085.14
156,503.67	144,312.69	112,796.55	31,516.14	827,440.58	165,488.12	661,952.46
119,037.78	94,898.96	74,371.01	20,527.95	620,735.77	124,147.16	496,588.61
74,273.91	295,618.25	234,094.96	61,523.29	123,395.35	24,678.96	98,716.39
421,262.57	246,688.72	197,124.22	49,564.50	634,486.84	126,897.36	507,589.48
106,022.12	327,463.00	261,770.60	65,692.40	276,805.60	55,361.11	221,444.49
116,469.39	65,521.88	51,969.16	13,552.72	336,219.18	67,243.83	268,975.35
36,675.78	189,480.96	147,391.72	42,089.24	1,715,399.89	343,079.98	1,372,319.91
70,476.63	68,043.86	53,411.65	14,632.21	369,474.00	73,894.80	295,579.20
.....	238,798.61	187,881.97	50,916.64	1,240,608.39	248,121.68	992,486.71
39,461.58	426,943.63	341,245.85	85,697.78	1,003,096.36	200,619.26	802,477.10
178,037.51	127,713.27	101,840.65	25,872.62	272,916.56	54,583.31	218,333.25
81,924.65	247,222.31	196,845.57	50,376.74	905,902.59	181,180.51	724,722.08
70,386.68	274,139.52	217,506.17	56,633.35	1,029,662.76	205,932.55	823,730.21
32,998.28	368,184.83	289,395.52	78,789.31	409,925.60	81,985.10	327,940.50
804.26	133,285.45	106,289.33	26,996.12	694,766.13	138,953.23	555,812.90
29,585.11	338,203.35	270,413.22	67,790.13	502,346.00	100,469.20	401,876.80
8,958.45	83,937.58	66,737.74	17,199.84	83,776.90	16,755.38	67,021.52
192,477.59	252,271.78	200,113.46	52,158.32	712,966.13	142,593.21	570,372.92
31,520.50	8,903.74	6,874.02	2,029.72	212,390.25	42,478.05	169,912.20
300,072.26	17,052.19	13,469.75	3,582.44	359,809.02	71,961.80	287,847.22
163,493.68	269,740.67	215,028.31	54,712.36	663,873.05	132,774.60	531,098.45
528,947.29	668,261.09	532,841.13	135,419.96	1,050,805.44	210,161.08	840,644.36
135,800.41	87,761.02	70,864.99	16,896.03	.....	.....	.....
136,813.98	109,288.97	87,065.89	22,223.08	482,112.48	96,422.50	385,689.98
268,823.30	351,904.44	277,178.36	74,726.08	556,379.86	111,275.97	445,103.89
62,675.43	245,265.25	195,791.69	49,473.56	684,795.91	136,959.18	547,836.73
98,461.66	262,199.08	207,927.43	54,271.65	3,682,169.13	736,433.83	2,945,735.30
246,626.16	872,818.63	697,211.17	175,607.46	1,197,861.80	239,572.36	958,289.44
300,501.27	\$8,637,603.31	\$6,865,329.88	\$1,772,273.43	\$27,250,317.87	\$5,450,063.32	\$21,800,254.55

County and Township figures for the year 1922 are largely estimates and not final.

AVERAGE ROAD COSTS

CLASS OF ROAD

WORK	TOWNSHIP ROAD		COUNTY ROAD		COUNTY PROVINCIAL		PROVINCIAL HIGHWAY		COUNTY SUBURBAN		COUNTY PROVINCIAL SUBURBAN		PROVINCIAL SUBURBAN	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
	Per	Mile	Per	Mile	Per	Mile	Per	Mile	Per	Mile	Per	Mile	Per	Mile
Earthwork.....	\$ 100	\$ 700	\$ 300	\$ 1,600	\$ 475	\$ 2,500	\$ 800	\$ 4,000	\$ 400	\$ 1,000	\$ 500	\$ 3,000	\$ 800	\$ 7,000
Culverts	250	1,100	300	1,400	450	2,000	1,200	4,000	400	1,200	500	2,200	2,000	6,000
Gravel Surface	500	1,600	800	2,400	1,500	3,500	1,600	5,000	1,000	3,000	1,500	3,500	.....	.....
Broken Stone.....	1,000	3,500	1,600	5,200	3,200	9,200	7,000	22,000	3,600	9,600	6,500	18,000	7,500	25,000
Bit. Penetration.....	.....	.....	10,000	18,000	16,000	22,000	22,000	39,000	16,000	36,000	.....	.....	23,000	45,000
Cement Concrete ..	.....	.....	13,000	25,000	25,000	35,000	25,000	45,000	25,000	30,000	25,000	40,000	28,000	48,000
Asphaltic Concrete	.....	.....	.....	.....	.....	.....	34,000	50,000	29,000	42,000	30,000	43,800	40,000	50,000
Vehicles Per Day	1 to 50		25 to 100		100 to 250		300 to 2500		200 to 500		200 to 750		1000 to 4000	

ROAD MAINTENANCE

What is the cost of maintaining Provincial Highways?

Roads should be built with a view to minimum maintenance cost, and service rendered, rather than with a view to minimum cost of construction alone.

The County of Wentworth in 1918 spent \$7,000 in repairing the macadam road between Dundas and Hamilton, about 2 miles in length. Within a year the effect of the expenditure had disappeared. There was no rougher road in Ontario to drive on. This road was substantially re-built in 1920, and is now giving excellent service. A census in 1922, when traffic was largely diverted by construction, showed a daily average of 3,130 vehicles, including motor busses, motor trucks and commercial vehicles.

Roads deteriorate and require repairs chiefly from two causes:

1. The effect of heavy traffic.
2. The effect of climate.

Ontario has extremes of heat and cold; heavy spring freshets, when snow and ice are melting; periods of drought, and occasional torrential rains; all of which conditions affect roads of the different types, in various ways and degrees.

Frost is a serious climatic agency of destruction. Its effects are principally serious only when water is present, when freezing and thawing disrupts the road and its foundation. For this reason adequate and ample drainage is needed on the roads of Ontario to carry away freshets, and to keep the road foundation dry.

Traffic is a chief agent of road destruction, and wear is nearly proportioned to the amount and character of traffic. Fast moving passenger cars are injurious, and for this reason, speed should be rigidly controlled, especially on gravel and macadam roads. Motor busses which start and stop frequently are especially destructive to the surface. Heavy motor trucks are destructive to road foundations, and their weight and speed must be regulated.

Maintenance costs, it is evident, vary chiefly with the class of surface, and the amount of traffic over them. Having regard to conditions on Provincial Highways, which are the most heavily travelled roads in the Province, annual repair and upkeep expenditure may be expected to approximate \$500 to \$1,200 per mile for gravel and macadam roads; \$300 to \$500 per mile for bituminous macadam, and \$200 to \$300 for asphaltic and cement concrete roads.

Except within city suburban districts, or on main routes between cities used for industrial purposes, a very limited mileage, the Provincial Highways have received no more snow road expenditure than was formerly the case under municipal control. That they have been in better condition has been chiefly due to the widening of the highway allowance to 86 feet, thereby removing the obstructions which formerly caused serious snow drifts. The entire snow road expenditure by the Department on Provincial Highways has been as follows:

In 1920, total expenditure on Provincial Highways ..	\$3,777 67
In 1921, total expenditure on Provincial Highways ..	2,320 81
In 1922, total expenditure on Provincial Highways ..	4,491 49

LABOUR EFFICIENCY ON PROVINCIAL HIGHWAYS

When construction on Provincial Highways was first undertaken, few contractors understood or would tender for work at prices which the Department could accept. Much work was therefore carried on by day labour, which for the years immediately following the war was everywhere scarce and difficult to control. Nevertheless, the Department obtained results for less than could then be had by contract.

At the present time, the situation is reversed, and work is principally carried out by contract. Few contractors have claimed to make a satisfactory showing on their work, particularly during 1922.

Day labour, where employed, principally for repair and patrol work, is paid according to the schedule of wages of the county in which the work is being done. Work is laid out by engineers in such a way as to reach the given result with the most direct application of labour. Foremen are retained only when they are able to show adequate results for the expenditure made; where inefficient, they are replaced by others. A fair day's labour is demanded, and where this is not given, men are dismissed. In cases of general neglect, work has been shut down and wholly reorganized. The complaint is as general, that the Department's rate of pay is not enough, as that it is too much.

The Department does not assume the right to regulate the contractors' rates of pay, hours of labour, etc., except where their rates may be too low; but in no case has the Department been called upon to interfere in this regard.

An occasional delinquent is to be found on every large work or organization. The individual farmer has to make allowance among his own hired men in this regard. It is the average which makes for results.

Having regard to the evidence of contractors that they have been making little or losing money; of others that the Department's rates of pay are low; and comparing with the amount of work accomplished on the roads, there is evidence of a very high average of efficiency on Provincial Highways.

DOMINION AID

The Dominion Government in 1919, under the Canada Highway Act, appropriated \$20,000,000 to aid the Provinces in building roads. This money is allocated to the Provinces, in proportion to population, Ontario's share being \$5,800,000.

This is paid to the Province on individual projects, which are from time to time submitted to the Ottawa Government for approval; the Province receiving 40 per cent. of the total expenditure on each approved project. Thus the money is not paid on the Provincial Highway System as a whole, nor on bridges; and in order that all may benefit, receipts from the Dominion Fund are applied to the general Highway Fund of the Province. To date the sum of \$3,374,247.29 has been received from Ottawa, and project statements have been filed sufficient to absorb the entire amount payable to the Province.

MOTOR VEHICLE REVENUE

Motor license revenue and registration has been growing in amount as follows:

	No. Registrations	Revenue
1919	139,288	\$1,580,146 61
1920	172,065	1,990,833 38
1921	201,532	2,945,360 36
1922	234,197	3,477,430 13
1923 (estimate)	260,000	4,400,000 00

This money is the basis of the Highway Improvement Fund of the Province, and as such, its benefits are returned to the municipalities in the form of subsidies to county and township roads, and in expenditure on Provincial Highways.

It will be observed that the growth of revenue from motor vehicles is due chiefly to a normal increase in the number of cars; and in a moderate degree only, to an increase in the amount of the license fee. For the year 1923, an additional fee of \$1.00 per car has been added, to compensate for the increasing cost of police service. Motor vehicle law enforcement is based on the Provincial registration lists, the use of corresponding number plates, etc. To meet the growing needs for traffic control, an increased service has become necessary.

LEGISLATION, 1920 TO 1922

Broadly, legislation for highway improvement in the Province at the beginning of 1920 provided for the following:

1. Provincial subsidy on county roads for construction and maintenance—40 per cent.
2. Provincial subsidy on Provincial county roads, construction and maintenance—60 per cent.
3. Provincial share of Provincial Highway construction and maintenance—70 per cent.; townships, 30 per cent.
4. Grants to townships consisted only of 40 per cent. of the salary of the road superintendent, with a maximum payment by the Province of \$150.00.

During and since 1920, the following modifications have been made:

A Provincial subsidy to townships was established, equal to 20 per cent. of the cash expenditure on maintenance and construction of township roads.

The limitation of payment to \$150 towards township road superintendent's salary was repealed and 40 per cent. of the entire salary is now paid.

The sum of \$2,000,000 was set apart from which the Province can make loans to townships for the purpose of carrying on road improvement, such loans to be guaranteed by the deposit of debentures and returnable to the Province, without interest, within a term not exceeding five years.

The Provincial Highway Act was amended, providing for an increase of the Government's share of the cost of Provincial High-

ways from 70 per cent. to 80 per cent., thus reducing the charge upon the counties from 30 per cent. to 20 per cent.

The Highway Improvement Act was amended to provide for the capitalization of the receipts from the registration of motor vehicles, setting apart the sum of \$2,000,000 per year, which will provide a fund of \$25,000,000 returnable in 20 years with interest and sinking fund charges. This sum of \$25,000,000 will form the basis for the capital expenditure on permanent work such as grading, bridges, culverts, etc., on the Provincial Highways and the cost of such work, therefore, will be spread over a period of years; and the Provincial share of Provincial Highways is thus paid out of motor vehicles revenue.

The absolute power of the Minister to control traffic; the driving of cattle, etc., on Provincial Highways was annulled.

The policy has been established of paying a reasonable Provincial subsidy on connecting links of main roads within towns and villages.

Provincial suburban areas have been created adjacent to cities, so that cities are now definitely committed to their share of the cost of Provincial Highways.

WIDENING PROVINCIAL HIGHWAYS

What is the object of widening the Provincial Highway to 86 feet?

Roads in Ontario were originally laid out with a width of 66 feet; in some few localities, 40 feet. That was at a time when only horse-drawn traffic was thought of; and when there were no telephone, telegraph or power lines to be considered.

By a series of fence encroachments, the original widths have commonly been reduced to about 54 feet in the case of 66 foot roads; and to 30 or 35 feet in the case of 40 foot roads. To compel the re-establishment of fences on the original lines would now involve expensive surveys, much litigation, and many cases of individual expense and hardship.

The chief objects of widening may be in part summarized as follows:

1. No one has suggested that a Provincial Highway should be less than 66 feet. In view of the many fence encroachments, it would now involve the moving of many miles of fence to obtain even this width, with little corresponding advantage to the highways.

2. The moving of fences and cutting of underbrush, etc., to a distance of 43 feet from the centre line of the road greatly minimizes the difficulty of keeping the road open in winter and reduces the cost of snow removal. This factor alone will pay substantial returns on the investment.

3. Provincial Highways are main arteries across the Provinces and as such usually have heavy lines of telegraph and telephone services; and in many cases electric power lines. Space is necessary for these services; but with these lines on the highway there is not sufficient space for the planting of trees in a position where they will be safe from mutilation. The result of placing wiring services on 66-foot roads is that mile after mile of shade trees have been mutilated and destroyed. The only way of preserving old trees on

these highways and of placing new trees where they will be safe is to provide the additional space for the 86 foot road allowance.

4. The additional space greatly facilitates the work of grading and draining the roads, and reduces the cost of the earth work.

5. The tendency is to increased travel on the highways, which, decade after decade, will require increased width of metalled or paved road surface. This requires increased width of road allowance, and by providing it at the present time a vast expenditure will be saved in the future. The entire Provincial Highway System can to-day be widened for no more than it cost the City of Toronto to widen North Yonge Street within the city limits.

The objections raised to the widening of the highway are in the main that there will be additional weed cutting, and that land is withdrawn from agriculture.

1. With respect to weed cutting, the Department is convinced that by reasonable attention to the roadsides, by grading and cleaning them up, a heavy sod can be ultimately secured which will permit only a minimum growth of weeds, and which can be kept cut by the Department at a very low cost.

2. With respect to the land withdrawn from agriculture, and as compared with the 66-foot road allowance, the entire land required for the present Provincial Highway System will amount to $2\frac{1}{2}$ acres per mile. A large proportion of this at the present time consists of swamp, rock and other varieties of waste and barren land; so that not more than one-half or two-thirds of it can be regarded as useful land. The additional drainage facilities provided by the greater width of road has enabled the Department, when draining the highway, to extend this drainage to many acres of farm land, and areas much in excess of that taken for widening have been reclaimed along the highways and brought under useful cultivation. The land cleaned up by the removal of old stump and stone fences, the removal of underbrush, etc., has much more than compensated for the additional land required for widening.

TRACTION ENGINES

"What is the intention of the Department in regard to the necessary moving of farm machinery on Provincial Highways, it being impossible to change lugs at all times?"

The Department has fully recognized the fact that threshing machinery and farm tractors must from time to time be moved over the highways. But a very large investment is being put into highway construction, and within reasonable limits, this investment should be protected. The statutes have, for some time, prohibited lugs or any type of wheel which would injure the highways; but enforcement of this statute has been sought by the Department only in cases where there appeared to be wilful or malicious injury when moving engines over pavements especially subject to injury.

The Department has from time to time conferred with manufacturers of traction engines and threshermen for the purpose of securing co-operation in protecting the highway investment. Recent statements from manufacturers would indicate that the difficulty is being solved by means of a false tire which may be conveniently clamped around the corrugated wheels of heavy traction engines when moving over paved surfaces.

TOURIST TRAFFIC

The amount of money brought into Canada and spent by tourists, particularly motorists from the United States, is very large, and with improved roads can be substantially increased. This money is spent freely for service at stores, hotels and summer resorts. It gives employment, and adds proportionately to the wealth of the Province.

The summer resort possibilities of many parts of Ontario are exceptional, and can be made to attract many times the present number of tourists from the United States. Such lake districts as Haliburton, Northern Frontenac, Hastings, Victoria, Peterborough, Renfrew, with the shore line of the Great Lakes, St. Lawrence and Ottawa Rivers, might well be made to form the summer playground of the continent, and bring streams of wealth to the Province.

Switzerland derives \$300,000,000 annually from tourists, whereas the famous watch-making industry of that country represents only a value of \$15,000,000 annually. California looks upon the "tourist crop" as the leading source of income to the State. The Commissioner of Parks of Canada estimates an income of \$108,000,000 from tourists travelling in Canada, which is second only to agriculture in wealth production. Better roads, coupled with improved hotels and summer resorts in the lake districts of Ontario, will greatly augment what has already become a substantial money producer.

In the United States are 10,000,000 motor cars, the owners of which desire to holiday in another country, and in northern latitudes. Ontario is eminently fitted to supply the opportunity and to tap this wonderful stream of wealth.

Northern Ontario is benefited by the building of Provincial Highways in the south. For until these roads are built in Southern Ontario, tourist traffic cannot reach the north. The main roads of Southern Ontario will pour tourist traffic into Muskoka, Parry Sound, Haliburton and the entire lake country which lies within a few hours travel north from the St. Lawrence River—a lake district as yet too little known and which because of inconvenience of access, has not yet been appreciated by the people of Ontario.

The food consumed by tourists at summer resorts is usually produced locally—vegetables, eggs, butter, milk, cream, fresh meat—and there is created a splendid market for the local farmers who cultivate to advantage the small areas of fertile land which lie among the picturesque hills and lakes of the "districts" of Ontario. By means of good roads through southern Ontario, the summer beauty of the north may be capitalized to the great advantage of the north and of Ontario as a whole.

GOVT PUBNS

